

Application No. 09/932,430
Amendment dated July 28, 2005
Reply to Office Action of April 25, 2005

Amendments to the Claims:

The below listing of claims will replace all prior versions, and listings, of claims in the application.

Claim 1 (currently amended). A club head for a golf club, the club head comprising a strike face and an outer shell defining a head volume of the club head, said club head having a first moment of inertia about a first axis that extends generally horizontally and parallel to said strike face, a second moment of inertia about a second axis that lies generally vertically and perpendicular to said first ~~horizontal~~ axis, and a center of gravity, said center of gravity lying below a horizontal centerline of said club head,

wherein said first moment of inertia, in units of ~~kilograms millimeters squared (kg-mm²)~~ kg-mm², is greater than or equal to approximately 77 plus 0.46 times the head volume, in units of ~~cubic centimeters (cc) cm³~~.

Claim 2 (currently amended). The club head of Claim 1, wherein the first moment of inertia in units of ~~kilograms millimeters squared (kg-mm²)~~ kg-mm² is greater than or equal to approximately 107 plus .46 times the head volume in ~~cubic centimeters (cc)~~ units of cm³.

Claim 3 (currently amended). The club head of Claim 1, wherein said center of gravity lies more than 1 ~~millimeter mm~~ below the horizontal centerline.

Claim 4 (currently amended). The club head of Claim 3, wherein the first moment of inertia in units of ~~kilograms millimeters squared (kg-mm²)~~ kg-mm² is greater than or equal to approximately 107 plus .46 times the head volume in ~~cubic centimeters (cc)~~ units of cm³.

Claim 5 (currently amended). The club head of Claim 1, wherein said club head has a mass of less than 250 grams.

Claim 6 (currently amended). The club head of Claim 1, wherein said club head has a mass of less than 230 grams.

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Claim 7 (currently amended). The club head of Claim 1, wherein said club head has a mass of less than 210 grams.

Claim 8 (currently amended). The club head of Claim 1, wherein said club head further includes a hosel and said center of gravity is located between 12 mm and 25 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 9 (currently amended): The club head of Claim 1, wherein said club head further includes a hosel and said center of gravity is located between 16 mm and 20 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 10 (currently amended). The club head of Claim 1, wherein said club head further includes a hosel and said center of gravity is located between 17 mm and 18 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 11 (currently amended). The club head of Claim 1, wherein said head volume is greater than 300 ~~centimeters-cubed~~ cm³.

Claim 12 (currently amended). The club head of Claim 11, wherein said club head further includes a hosel and said center of gravity is located between 12 mm and 25 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 13 (currently amended). The club head of Claim 11, wherein said club head further includes a hosel and said center of gravity is located between 16 mm and 20 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 14 (currently amended). The club head of Claim 11, wherein said club head further includes a hosel and said center of gravity is located between 17 mm and 18 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

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Claim 15 (currently amended). The club head of Claim 1, wherein said head volume is less than 200 ~~centimeters-cubed~~ cm³.

Claim 16 (currently amended). The club head of Claim 15, wherein said center of gravity lies more than 2 ~~millimeters~~ mm below the horizontal centerline.

Claim 17 (currently amended). The club head of Claim 15, wherein said club head further includes a hosel and said center of gravity is located between 12 mm and 25 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 18 (currently amended). The club head of Claim 15, wherein said club head further includes a hosel and said center of gravity is located between 16 mm and 20 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 19 (currently amended). The club head of Claim 15, wherein said club head further includes a hosel and said center of gravity is located between 17 mm and 18 ~~millimeters~~ mm from an axis that lies along the center of said hosel.

Claim 20 (currently amended). The club head of Claim 1, wherein said second moment of inertia is greater than 250 ~~kilograms-millimeters-squared~~ kg-mm².

Claim 21 (currently amended). The club head of Claim 1, wherein said second moment of inertia is greater than 300 ~~kilograms-millimeters-squared~~ kg-mm².

Claim 22 (original). The club head of Claim 1, wherein said club head includes a plurality of weights.

Claim 23 (original). The club head of Claim 22, wherein said plurality of weights lie along a front/back axis that extends generally perpendicular from said strike face.

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Claim 24 (original). The club head of Claim 22, wherein said plurality of weights lie below said horizontal centerline.

Claim 25 (original). The club head of Claim 24, wherein said plurality of weights also lie along a front/back axis that extends generally perpendicular from said strike face.

Claims 26-30 (canceled).

Claim 31 (new). A golf club head comprising:

- an outer shell;
- a strike plate coupled to the outer shell, the strike plate having a strike face, the outer shell and the strike face defining a club head volume;
- a center of gravity disposed below a horizontal centerline of the club head;
- a heel/toe axis extending through the center of gravity, generally parallel to the strike face, and generally horizontal relative to a ground plane when the club head is at an address position; and
- a rotational moment of inertia about the heel/toe axis, wherein the rotational moment of inertia about the heel/toe axis is related to the club head volume by the equation $I_{xx} \geq .46 * HV + 77$, where I_{xx} is the rotational moment of inertia about the heel/toe axis in units of $\text{kg}\cdot\text{mm}^2$ and HV is the club head volume in units of cm^3 .

Claim 32 (new). The golf club head of claim 31, wherein the rotational moment of inertia about the heel/toe axis is related to the club head volume by the equation $I_{xx} \geq .46 * HV + 107$, where I_{xx} is the rotational moment of inertia about the heel/toe axis in units of $\text{kg}\cdot\text{mm}^2$ and HV is the club head volume in units of cm^3 .

Claim 33 (new). The golf club head of claim 31, wherein the center of gravity is disposed at least 1 mm below the horizontal centerline.

Claim 34 (new). The golf club head of claim 33, wherein the center of gravity is disposed more than 2 mm below the horizontal centerline.

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Claim 35 (new). The golf club head of claim 31, wherein the club head has a total mass of less than 250 grams.

Claim 36 (new). The golf club head of claim 35, wherein the club head has a total mass of less than 230 grams.

Claim 37 (new). The golf club head of claim 36, wherein the club head has a total mass of less than 210 grams.

Claim 38 (new). The golf club head of claim 31, wherein the club head has a total mass within a range of about 180 grams to about 210 grams.

Claim 39 (new). The golf club head of claim 31, wherein the club head has a total mass within a range of about 200 grams to about 250 grams.

Claim 40 (new). The golf club head of claim 31, further comprising a hosel coupled to the outer shell and a hosel axis extending axially through the hosel, wherein a horizontal distance measured between the center of gravity and the hosel axis is between about 12 mm to about 25 mm.

Claim 41 (new). The golf club head of claim 40, wherein the horizontal distance measured between the center of gravity and the hosel axis is between about 16 mm to about 20 mm.

Claim 42 (new). The golf club head of claim 41, wherein the horizontal distance measure between the center of gravity and the hosel axis is between about 17 mm to about 18 mm.

Claim 43 (new). The golf club head of claim 31, wherein the head volume is between about 200 cm³ to about 450 cm³.

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Claim 44 (new). The golf club head of claim 43, wherein the head volume is between about 200 cm³ to about 300 cm³.

Claim 45 (new). The golf club head of claim 31, wherein the head volume is greater than 300 cm³.

Claim 46 (new). The golf club head of claim 31, wherein the head volume is less than 200 cm³.

Claim 47 (new). The golf club head of claim 31, wherein the strike plate and outer shell are comprised of titanium or a composite material.

Claim 48 (new). The golf club head of claim 31, further comprising:

a vertical axis extending through the center of gravity of the club head generally perpendicular to the heel/toe axis; and

a rotational moment of inertia about the vertical axis greater than 250 kg-mm².

Claim 49 (new). The golf club head of claim 48, wherein the rotational moment of inertia about the vertical axis is greater than 300 kg-mm².

Claim 50 (new). The golf club head of claim 31, further comprising a plurality of removable weights coupled to the outer shell.

Claim 51 (new). The golf club head of claim 50, wherein the club head has a total mass, and wherein the removable weights comprise about 10% to about 40% of the total mass.

Claim 52 (new). A golf club head comprising:

an outer shell;

a strike plate coupled to the outer shell, the strike plate having a strike face, the outer shell and the strike face defining a club head volume;

a center of gravity disposed at least 1 mm below a horizontal centerline of the club head;

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a hosel coupled to the outer shell and a hosel axis extending axially through the hosel, wherein a horizontal distance measured between the center of gravity and the hosel axis is between about 12 mm to about 25 mm;

a heel/toe axis extending through the center of gravity, generally parallel to the strike face, and generally horizontal relative to a ground plane when the club head is at an address position; and

a rotational moment of inertia about the heel/toe axis, wherein the rotational moment of inertia about the heel/toe axis is related to the club head volume by the equation $I_{xx} \geq .46 * HV + 77$, where I_{xx} is the rotational moment of inertia about the heel/toe axis in units of $\text{kg}\cdot\text{mm}^2$ and HV is the club head volume in units of cm^3 ;

a vertical axis extending through the center of gravity of the club head generally perpendicular to the heel/toe axis; and

a rotational moment of inertia about the vertical axis greater than $250 \text{ kg}\cdot\text{mm}^2$;

wherein the golf club head has a total mass of less than 250 grams and a head volume between about 200 cm^3 to about 450 cm^3 .

Claim 53 (new). The golf club head of claim 52, wherein the center of gravity is disposed more than 2 mm below the horizontal centerline.

Claim 54 (new). The golf club head of claim 52, wherein the club head has a total mass of less than 230 grams.

Claim 55 (new). The golf club head of claim 54, wherein the club head has a total mass of less than 210 grams.

Claim 56 (new). The golf club head of claim 52, wherein the horizontal distance measured between the center of gravity and the hosel axis is between about 16 mm to about 20 mm.

Claim 57 (new). The golf club head of claim 56, wherein the horizontal distance measure between the center of gravity and the hosel axis is between about 17 mm to about 18 mm.

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Claim 58 (new). The golf club head of claim 52, wherein the rotational moment of inertia about the vertical axis is greater than 300 kg-mm^2 .

Claim 59 (new). The golf club head of claim 52, further comprising a plurality of removable weights coupled to the outer shell.

Claim 60 (new). The golf club head of claim 59, wherein the club head has a total mass, and wherein the removable weights comprise about 10% to about 40% of the total mass.